

ABSTRACT OF DISCLOSURE

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POLYIMIDES BY PHOTOCHEMICAL CYCLOPOLYMERIZATION

The novel polyimides of this invention are derived from Diels-Alder cyclopolymerization of photochemically generated bisdienes with dienophiles, such as bismaleimides, trismaleimides and mixtures thereof with maleimide end-caps. Irradiation of one or more diketones produces two distinct hydroxy o-quinodimethane (photoenol) intermediates. These intermediates are trapped via Diels-Alder cycloaddition with appropriate dienophiles, e.g., bismaleimide and/or trismaleimides to give the corresponding polyimides in quantitative yields. When bismaleimides, trismaleimides or mixtures thereof with maleimide end-caps are used as the dienophile, the resulting polyimides have glass transition temperatures (T_g) as high as 300°C. Polyimide films can be prepared by ultraviolet irradiation of high solids content varnishes of the monomers in a small amount of solvent, e.g., cyclohexanone, dimethyl formamide, N-methylpyrrolidone and the like. These novel polyimides are characterized as having high glass transition temperatures, good mechanical properties and improved processing in the manufacture of adhesives, electronic materials and films.

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